

REMARKS

Applicant respectfully requests reconsideration and allowance of subject application. Claims 5-8 are canceled. Claim 1 is amended. Claims 1-4 and 9-18 are pending.

Applicant thanks the Examiner for the detailed analysis presented in this Office Action.

Double Patenting

Claims 5-8 are objected to under 37 C.F.R. 1.75 as being a substantial duplicate of claims 1-4. Claims 5-8 are canceled to obviate this objection.

Claim Rejections under 35 U.S.C. §§ 102 and 103

Claims 1-8 are rejected under 35 U.S.C. § 102 as being anticipated by, or in the alternative, under 35 U.S.C. § 103 as obvious over U.S. Patent No. 6,748,538 to Chan et al. (hereinafter, "Chan"). Claims 5-8 are canceled, thereby rendering moot the rejection of these claims. With respect to claim 1-4, Applicant respectfully traverses the rejection.

The subject application is directed to challenges facing serverless distributed file systems. One particular challenge concerns managing files that are distributed over many different computers in a manner that allows a user to quickly access a file, verify that it is indeed the requested file, and read/write that file, all while ensuring that the files are stored and accessed in a secure way that prevents access by non-authorized users.

1 The subject application describes a serverless distributed file system that
2 stores files across multiple computers in a manner that addresses this challenge.
3 The implementations described in the specification are captured in the claims.

4 **Claim 1** is amended to move the preamble into the body of the claim and to
5 make explicit that the method pertains to storage and modification of files stored
6 in a distributed file system. Claim 1, as amended, is reproduced below:

7
8 1. A method comprising:
9 storing files across multiple computers in a distributed file
10 system;
11 making changes to certain files;
12 collecting the changes that are made to the certain files stored
13 in the distributed file system; and
14 digitally signing the changes in batch.
15

16 Chan discloses a platform (e.g., computer, communication equipment, set-
17 top box) having memory to store multiple software components and a manifest
18 that contains a hash digest of each software component. A processor verifies
19 integrity of the software components by re-computing the digests of the
20 components and comparing them with the digests in the manifest.

21 It is first noted that Chan is not directed to a distributed file system, or to
22 storage of "files across multiple computers in a distributed file system", or to
23 "making changes to certain files", as now expressly recited in claim 1. Rather,
24 Chan is directed to checking the integrity of software components residing on a
25 single machine or platform. (*Chan*, col. 3, lines 46-48). The components are not

1 stored in the distributed file server, nor does Chan ever discuss that the software
2 components are changed or modified.

3 It is further noted that the Office later stipulates, in its rejection of claims
4 14 and 17, that "Chan is silent regarding the underlying file system upon which his
5 disclosure is implemented." (*Office Action*, page 8, lines 8-10 and page 9, lines 6-
6 8). For this reason alone, it is respectfully submitted that the §102 rejection should
7 be withdrawn.

8 Turning to the §103 rejection, Chan does not teach or suggest such a
9 distributed file system, or how changes are made to files stored in the file system.
10 Chan also fails to teach or suggest "collecting the changes that are made to the
11 certain files stored in the distributed file system" and "digitally signing the
12 changes in batch."

13 While Chan discloses a manifest that contains digests of individual
14 software components, this is a onetime manifest constructed at production of the
15 software components and delivered with the software components to be executed
16 on the platform or machine. When the software is executed, the machine simply
17 re-computes the manifest, or digests therein, and compares it to the existing
18 manifest to make sure the software components are authentic.

19 Chan fails to discuss or even suggest that the software components are ever
20 changed or modified. That is because Chan is not concerned with the challenge of
21 managing files that are distributed over many different computers. Chan need not
22 worry about how a user would quickly access a file, verify that it is indeed the
23 requested file, and make changes by writing to that file, while still ensuring that
24 the files are stored and accessed in a secure way that prevents access by non-
25 authorized users.

1 Accordingly, Chan fails to teach or suggest method of claim 1.

2 The Office argues that when Chan re-computes the manifest that "it can be
3 construed that the second manifest is a collection of changes that are made to the
4 multiple files stored in the file system." (*Office Action*, page 3, bottom of top
5 paragraph). Applicant disagrees with this argument on two counts. First, nowhere
6 does Chan ever address or acknowledge that the system pertains to files stored in a
7 distributed file system. Second, the "second manifest" noted by the Office does
8 not contain a collection of changes made to the software components as the Office
9 asserts; rather, the second manifest must be specifically reconstructed from *exactly*
10 *the same software components* in order for the integrity of the software to be
11 verified. The whole purpose of Chan is to verify software integrity.

12 For the reasons given above, claim 1 is allowable over Chan. Applicant
13 respectfully requests that the § 102 and § 103 rejections of claim 1 be withdrawn.

14 **Claims 2-4 are allowable by virtue of their dependency on claim 1.**

15
16 Claims 9, 12, and 13 are rejected under 35 U.S.C. § 103 as being
17 unpatentable over Chan. Applicant respectfully traverses the rejection.

18 **Claim 9 is reproduced below:**

19
20 9. In a distributed file system that stores encrypted files
21 across multiple computers, a method comprising:
22 modifying one or more of the encrypted files;
23 computing a hash value of each modified encrypted file;
24 collecting the hash values into a group;
25 computing a hash value of the group; and

1 digitally signing the hash value of the group of hash values.

2
3 For the reasons give above for claim 1, claim 9 is also allowable over Chan.

4 The Office asserts that Chan teaches the acts of “computing”, “collecting”,
5 “computing”, and “digitally signing”. Applicant respectfully disagrees. Applicant
6 further notes that the Office only addresses part of the claimed method. The
7 method of claim 9 also includes “modifying one or more of the encrypted files”,
8 where the encrypted files are stored across multiple computers in a distributed file
9 system. The Office does not address this “modifying” act. Chan is silent as to this
10 feature because, as noted above, Chan does not contemplate modifying the
11 software components. Instead, Chan specifically teaches verification of
12 unchanged software components.

13 Thus, claim 9 is allowable over Chan and the §103 rejection should be
14 withdrawn.

15 **Claims 12-13** are allowable by virtue of their dependency on claim 9.

16
17 Claims 10 and 11 are rejected under 35 U.S.C. § 103 as being unpatentable
18 over Chan in view of U.S. Patent Application Publication 2002/0103818 to
19 Amberden (hereinafter, “Amberden”) and U.S. Patent No. 6,704,730 to Moulton et
20 al. (hereinafter, “Moulton”). Applicant respectfully traverses the rejection.

21 **Claims 10-11** depend from claim 9 and thus incorporate all of the
22 limitations recited in claim 9. As noted above, Chan fails to teach or suggest the
23 method of claim 9. Amberden and Moulton are equally silent and do not provide
24 the requisite teaching that is missing from Chan.

Amberden is cited for teaching a repository database for file data that includes a metadata stream. Even assuming this teaching, Amberden does not address storage of encrypted files in a distributed file system, nor how to make modifications to such files. Accordingly, the combination of Chan and Amberden does not teach or suggest the features for claim 9 from which claims 10 and 11 depend.

It is also questioned whether Amberden is prior art. Amberden is a publication of an application filed on April 30, 2001, after the filing date of March 21, 2001 of the subject application. Amberden does claim priority to an earlier filed provisional application, but there is nothing in the record from the Office as to whether the earlier filed provisional application contained the subject matter that is relied upon in this rejection. Accordingly, Applicant respectfully requests that the Office withdraw Amberden as a reference, or demonstrate that the provisional application contained the subject matter relied upon by the Office.

Moulton is cited for teaching a hash file system that uses a tree with accessible nodes containing hash values of files. Even assuming this teaching, Moulton does not address storage of encrypted files in a distributed file system, nor how to make modifications to such files. Accordingly, the combination of Chan, Amberden, and Moulton does not teach or suggest the features for claim 9 from which claims 10 and 11 depend.

Claims 14, 17, and 18 are rejected under 35 U.S.C. § 103 as being unpatentable over Chan in view of an article entitled "Severless Network File Systems", Feb. 1996, to Anderson et al. (hereinafter, "Anderson"). Applicant respectfully traverses the rejection.

1 Claim 14 is reproduced below:

2
3 14. One or more computer readable media comprising
4 computer-executable instructions that, when executed, direct a
5 computing device to:

6 modify individual files stored in a serverless distributed file
7 system;

8 compute a hash value of each modified file;

9 collect the hash values into a group; and

10 digitally signing the group of hash values.
11

12 For the reasons give above for claims 1 and 9, Chan does not teach or
13 suggest the features in claim 14. Anderson is equally silent, and hence the
14 combination of Chan and Anderson does not teach the features of claim 14.

15 The Office notes that Chan is silent as to the underlying nature of the file
16 system upon which his invention can be implemented. Applicant agrees.
17 Moreover, as noted above, Chan does not teach modifying individual files stored
18 in a serverless distributed file system, computing a hash value of each modified
19 file, collecting the hash values into a group, and digitally signing the group of hash
20 values as recited in claim 14.

21 Anderson is cited as teaching an experimental file system that is both
22 serverless and distributed by design. That is where the teaching ends. Even
23 inferring that Anderson teaches storage and modification of files, as the Office
24 asserts, Anderson does not address *how* such files are stored and modified, and
25

1 how those modifications are handled. Accordingly, the combination of Chan and
2 Anderson does not teach or suggest the features of claim 14.

3 Moreover, there is no motivation to combine Chan and Anderson and the
4 Office has not made an appropriate case as to why a skilled artisan would make
5 the combination. The Office notes:

6
7 It can be reasonably inferred that among the features of xFS is
8 the ability to modify individual files (Anderson, Chapter 3.2.3,
9 "Cache Consistency"). Therefore, it would have been obvious to
10 one of ordinary skill in the art at the time of the invention
11 disclosed by Applicant to implement the method disclosed by
12 Chan on top of a serverless distributed file system such as the
13 one disclosed by Anderson. (*Office Action*, Page 8, lines 14-19).

14
15 This explanation is flawed because Chan has no desire to modify files.
16 Indeed, the integrity verification described by Chan involves checking for
17 identical files. There is no desire or hint in Chan to modify files. Thus, a skilled
18 artisan would not be motivated to consider another reference, such as Anderson,
19 directed to a distributed file system in which files are presumably stored and
20 modified in some manner.

21 Thus, claim 14 is allowable over Chan and Anderson. Applicant
22 respectfully requests withdrawal of the §103 rejection.

23 Claims 17-18 are allowable by virtue of their dependency on claim 14.
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1 Claims 15-16 are rejected under 35 U.S.C. § 103 as being unpatentable
2 over Chan and Anderson, and further in view of an Amberden and Moulton.
3 Applicant respectfully traverses the rejection.

4 Claims 15-16 depend from claim 14 and thus incorporate all of the
5 limitations recited in claim 14. As noted above, Chan and Anderson fails to teach
6 or suggest the method of claim 14. For the reasons given above with respect to
7 claim 10 and 11, Amberden and Moulton are equally silent. Thus, the
8 combination of Chan, Anderson, Amberden, and Moulton fails to teach or suggest
9 the features of claim 14, from which claims 15 and 16 depend.

10 Applicant respectfully requests that the §103 rejection of claims 15 and 16
11 be withdrawn.

12
13 **Conclusion**

14 Claims 1-4 and 9-18 are in condition for allowance. Applicant respectfully
15 requests reconsideration and prompt allowance of the subject application. If any
16 issue remains unresolved that would prevent allowance of this case, **the Examiner**
17 **is requested to urgently contact the undersigned attorney to resolve the issue.**

18
19 Respectfully Submitted,

20 Date: Dec. 10, 2004

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